

Docket No. 520.41122X00
Serial No. 10/058,781
Office Action dated April 12, 2006

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. - 4. (Canceled)

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5. (Currently Amended) ~~An~~ The optical switching system according to claim 3, configured by multistage-connecting a plurality of optical switching devices, wherein the optical switching device comprises a plurality of optical reflection monitors with an optical reflection monitoring function, the optical reflection monitors detecting reflected light on a path transmitting an optical signal input to the optical switching device, and locating positions of reflection on the path, and wherein the optical reflection monitors comprise an optical isolator that passes only the optical signal and blocks the reflected light; an optical branching circuit that separates the reflected light of the optical signal; and an optical detector that monitors the reflected light.

6. (Currently Amended) ~~An~~ The optical switching system according to claim 3, configured by multistage-connecting a plurality of optical switching devices, wherein the optical switching device comprises a plurality of optical reflection monitors with an optical reflection monitoring function, the optical reflection monitors detecting reflected light on a path transmitting an optical signal input to the optical switching device, and locating positions of reflection on the path, and wherein the optical reflection monitors comprise an optical circulator that allows the passage of the optical signal and circulates or blocks the reflected light of the optical signal, and an

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optical detector that monitors the reflected light.

7. (Withdrawn) A reflected light measuring system, comprising a terminal provided with optical reflection measuring software; an optical switching system with an optical switching unit that controls switching of optical signals; a reflected light meter that measures reflected light of the optical signals; and a port selector that selects an optical signal input path to the optical switching unit; wherein the terminal is operable by executing the software, to control the operation of the reflected light meter, the port selector, and the optical switching unit, to measure the reflected light of the optical signals, and locate the reflecting positions.

8. (Withdrawn) The reflected light measuring system according to claim 7, wherein the terminal is a portable personal computer; the reflected light meter includes a control and monitoring unit that monitors the reflected light, a light source including a laser diode, and an optical detector that detects the reflected light; the port selector includes a selector that selects ports for optical signals and a control unit that controls the selectors; and the optical switching system includes a system control and monitoring unit and optical switching units.

9. (Withdrawn) The reflected light measuring system according to claim 8, wherein the system control and monitoring unit includes a switching information memory unit that stores information about switched paths of the optical switching unit, and an optical reflection alarm information memory unit that stores reflected light alarm and other types of information transferred from the reflected light meter.

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10. (Withdrawn) The reflected light measuring system according to claim 8, wherein the software is storable not only in the terminal but also in the control and monitoring unit in the reflected light meter and/or in the system control and monitoring unit in the optical switching system.

11. (Original) An optical switching method enabling detection of reflected light, the method comprising the steps of:

making a setting for switching an optical switch and storing optical interconnection relationships;

making a selection of a circuit board on which optical switching devices are mounted according to a command from an operation control unit and storing an optical reflection alarm information; and

locating positions of reflection according to the optical interconnection relationships and the optical reflection alarm information being stored.

12. (Original) The optical switching method according to claim 11, wherein the step of storing the optical interconnection relationships includes steps of transmitting a switching command to multistage-connected optical switching devices according to a command from an operation control unit; after completing the necessary settings for switching of the optical switching devices, updating the contents of the optical interconnection relationships being stored based on switching information transferred from the optical switching device.

13. (Original) The optical switching method according to claim 11, wherein the step of storing the optical reflection alarm information includes steps of transferring

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the optical reflection alarm information from the optical switching device to the operation control unit after transmitting an optical reflection alarm acquisition request to the optical switching device mounted on the selected circuit board by the CPU; and updating the contents of the optical reflection alarm information being stored based on the optical reflection alarm information by the CPU.

14. (Original) The optical switching method according to claim 11, wherein the step of locating the positions of reflection includes steps of detecting an alarm position according to the optical reflection alarm information that has been stored, when optical reflection alarm information is present; searching the optical interconnection relationships being stored; selecting a suspected abnormal optical interconnection path; and after determining a rearmost connection among interconnected points at which reflected light occurs, notifying the operation control unit of the rearmost connection.

15. (Currently Amended) A method of ~~setting switching information and~~ collecting optical reflection alarm information in the an optical switching device, system including a system control unit and a plurality of optical switch boards each of which is provided with a board control unit and a plurality of optical reflection monitors coupled to I/O ports of an optical switching unit, the method comprising the steps of:

performing a settings for optical path switching of in each of said optical switching units switches and setting storing information indicative of optical interconnection relationships between the I/O ports into a switching information register by a each of said switching board control units in an optical switching

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device in accordance with instructions from said system control unit; and
after selecting an one of said optical reflection monitors circuit by the CPU,
one after another by each of said board control units;
performing A/D conversion of determining status of an optical signal path
passing through an I/O port coupled to said selected optical reflection monitor by
comparing a monitored signal received from the selected optical reflection monitor
circuit, transferring the converted monitored signal to a monitoring and with a
predetermined threshold by said board control unit; and
setting status information indicative of the status of said optical signal path
into an optical reflection monitoring register therein by said board control unit; and
collecting said status information from each of optical switch boards by said
system control unit.

16. (Canceled)

17. (Currently Amended) The method according to claim 15,

~~wherein the step of setting an optical reflection monitoring register further~~
~~includes the step of setting the optical reflection monitoring register so that a~~
~~comparison is made between the status of said optical signal path is determined by~~
~~comparing the an A/D converted monitored signal value and with said a threshold~~
~~stored in the monitoring and by said board control unit for use in processing; and~~
~~said status information includes writing a "1" bit into a memory in the~~
~~monitoring and control unit is made to indicate an abnormal condition when the~~
~~monitored signal value is was judged smaller than the threshold; and writing a "0" bit~~
~~into the memory is made to indicate a normal condition when the monitored signal~~

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value is ~~was judged larger not smaller~~ than the threshold.

18. (Withdrawn) A method of measuring an optical reflection position in an optical switching unit by using an optical reflecting measuring system, comprising the steps of:

transmitting a switching command to a port selector under control of a portable terminal;

transmitting the switching command to the optical switching unit under control of the portable terminal;

requesting acquisition of a reflected light measurement value by a reflected light meter; and

searching an optical reflection alarm control table and an interconnection control table and locating an abnormal alarm position.

19. (Withdrawn) The method according to claim 18, wherein the step of requesting acquisition of the reflected light measurement value further includes steps of comparing the reflected light measurement value transferred from the reflected light meter with a threshold stored in an optical reflection alarm information memory in a control and monitoring unit; and updating the optical reflection alarm information memory by writing a "1" into a memory in the monitoring and control unit to indicate an abnormal condition when the reflected light measurement value is smaller than the threshold and by writing a "0" into the memory to indicate normality when the reflected light measurement value is larger than the threshold.

20. (Withdrawn) The method according to claim 18, wherein the step of

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locating an abnormal alarm position includes the steps of searching the optical reflection alarm control table and detecting an alarm position when information stored in the optical reflection alarm information memory indicates an abnormal condition, further includes the steps of searching the interconnection control table; selecting an interconnection with a suspected abnormal optical fiber; and determining a rearmost connection among interconnected positions at which reflected light occurs.

21. (Canceled)